Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Journal Pre-proof

Colorectal cancer screening in the COVID-19 era

Evelien Dekker, Han-Mo Chiu, Iris Lansdorp-Vogelaar, On behalf of the Expert Working Group on COVID-19 of the WEO Colorectal Cancer Screening Committee, Luis Ernesto Caro, Jason A. Dominitz, Stephen Halloran, Cesare Hassan, Julia Ismael, Rodrigo Jover, Michal F. Kaminski, Tim Kortlever, Ernst J. Kuipers, Theodore R. Levin, Takahisa Matsuda, Dominika Novak Mlakar, Lix A.R. Oliveira, Susan Parry, Linda Rabeneck, Matthew Rutter, Roque Sáenz, Carlo Senore, Graeme P. Young, Ning Zhang

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Supplementary file S1

CRC Screening Programmes & COVID-19 - A World Perspective

Newsletter version 4.5 -11/6/2020 - *Earlier contributions are presented in small italics!*

China 7/6/2020

Ning Zhan, Department of Gastroenterology, Sun Yat-sen University, Guangzhou,510080, P.R. China

There is no national CRC screen program in China but we have CRC screening programs on the municipal, district and community levels, offered by local medical organizations and hospitals.
As an example, in Guangzhou, the city where I live and work, we offer free CRC screening for all citizens aged 50-74 years of age. People are requested to have a CRC risk assessment using two FIT tests. If either FIT test is positive, they will be advised to have colonoscopy. We had a total of 371,046 participants between 2015 and 2017, with 61,272 positive tests. We have an increasing number of people requesting and paying for colonoscopy screening. There are two main reasons for the increase in screening in China. The first is that people have an increased awareness of colon cancer and the value of colonoscopy examinations and the second is that colonoscopy in China is only 50-60 USD!
During the COVID-19 pandemic many non-emergency medical services were suspended but have now largely resumed including CRC screening. All patients are required to do a COVID-19 test before their CRC screening.

Argentina 10/6/2020

Julia Ismael, Clin. Oncol., Policy Researcher - Global Health, Former Director NCI, Board Member of RINC-ALC

In Argentina, the National Program for the Prevention and Early Detection of CCR was created in 2013.
It began as pilots in Misiones and Tucuman using quantitative FIT following the WHO and European guidelines. In 2018, population screening began to extend to new provinces including Neuquen, Mendoza, Entre Ríos, Jujuy, Río Negro and Chaco. We are currently targeting 10% of the national population that can be considered to be of average risk (men and women aged 50-75 years of age) but are determined to increase this proportion. The Public Sector provides annual qualitative FIT and the private sector, biennial quantitative FIT.

In 19 March, Argentina entered a nation-wide lockdown and all screening activity was suspended, including the distribution of FIT, invitation to patients and VCC. Our quarantine has been extended on several occasions to date.
Argentina is working on a post-pandemic exit plan towards the new pseudo normality in the field of cancer control, along with other leaders in the region.

Chile - 3/6/ 2020

Francisco López-Köstner MD, Director of PRENEC (Prevención neoplasias colorrectales), Chile

Our program, called 'Prenec', commenced screening in 2012 with biennial FIT (OC sensor-micro). The target population are asymptomatic people between 50-75 years of old and 70% of those who are FIT positive are investigated by colonoscopy. Seven public hospitals provide the high-quality colonoscopy using a common protocol. We have some opportunistic screening in private clinics, but we have no public programs. The 7 hospitals stretch from the north to the south of Santiago (our capital) and each team is trained in our institution (Clínica Las Condes). A special database was designed to help us organise the screening network. We have now screened more than 30,000 people and have diagnosed approximately 300 colorectal cancers. Diagnosis and treatment options within the network are discussed at a monthly teleconference. We also have been training many other Latin America countries including Colombia, Equator, Peru, Bolivia, Paraguay and the later is expected to start this year.

At the beginning of April, the COVID pandemic resulted in us stopping FIT screening invitations and shortly afterwards stopping colonoscopies on FIT + patients. We currently hope to recommence the program in August.

Japan 3/6/2020

Takahisa Matsuda, Cancer Screening Center/ Endoscopy Division, Center for Public Health Sciences, Japan

Japanese population-based cancer screening program is conducted by more than 1,000 municipalities. Population-based cancer screening was postponed in April, by many municipalities, when the COVID-19 infection spread and the emergency declaration was issued nationwide, and most municipalities have not yet restarted. two examples; Sapporo city paused from mid-April to the end of May, and Osaka city stopped CRC screening in April and restarted at the end of June. However, even during the period of 'emergency declaration', follow-up colonoscopy for people with positive results from a faecal immunochemical test (FIT) continued while limiting the number of examinations. The emergency declaration was lifted on June 1, and each municipality is gradually preparing for the resumption. On the other hand, opportunistic cancer screening was also discontinued at most facilities from April 2020; screening colonoscopy however restarted at several facilities from 1st June.

Most, if not all, municipalities have a large backlog of FIT positive follow-up colonoscopies. In our Endoscopy center (National Cancer Center Hospital), we have stopped surveillance colonoscopies and currently perform emergency endoscopy and limitedly work-up colonoscopy of FIT positive patients.

Brazil 2/6/2020

Lix Alfredo Reis de Oliveira
Coordinator of Brazilian CRC Screening Program from Brazilian Endoscopic Society (SOBED)

The Brazilian scenario. In Brazil, it was predicted for 2020 that colorectal cancer will be the second cancer in men and women, surpassing lung cancer in men, with the forecast of 40990 new cases and 18867 deaths (INCA- National Cancer Institute - 2020). In Brazil, we currently carry out sporadic colorectal cancer screening and we were conducting a National Organized Program for Colorectal Cancer Screening adjustable in different regions of Brazil, as we are a continental country with marked differences in incidence in different regions of Brazil. Unfortunately, the conversations are in the background due to the pandemic, but they will certainly return. Even the opportunistic program was interrupted due to the pandemic and we estimate that approximately 6000 new cases were not diagnosed in March and April 2020 compared to 2019. Brazil is still on the upward curve of COVID 19 and the peak of the pandemic is estimated for early July, so there is unfortunately no way to think about reopening for screening.

Italy - 10/6/2020

Carlo Senore

CRC screening programs in Italy will have recommenced their activity by the end of June. In some Regions have started activity already.
CRC screening programs in Italy will have recommenced their activity by the end of June. In some Regions have started activity already.

We have defined a set of activity indicators which will be monitored by all regions with the regional screening coordinators reporting every two months to the National Screening Monitoring centre with an update on the volume of screening activity, compared to the same period in the past year. All regions have been requested to answer a questionnaire designed to investigate their policy regarding their backlog.

In Piedmont we have developed a new set of recommendations designed to ensure the safety of patients and operators when screening. Guiding principles during this phase include:

1. A gradual increase in the volume of screening activity applying strict monitoring of performance and quality indicators thus providing information about the impact of the emergency and policies designed to help recovery
2. Ensuring that the health professionals required to support COVID-19 clinical activity return to their screening roles
3. Promoting the appropriateness of endoscopy activity to avoid competition for the limited resources, in screening (i.e. postpone unnecessary surveillance examinations) and in routine clinical work (i.e. reassess the appropriateness of referrals for colonoscopy and transferring requests for examination of asymptomatic subjects to the screening program)
4. Implementing communication campaigns which target subjects eligible for screening, GPs, and health professionals involved in screening

We are completing the plans to restart our collaboration with pharmacies which are used for both the distribution of FIT kits and their collection when completed. We need to clarify concerns which relate to the potential risk of infection when handling the samples (negligible, if any risk, but many people are still concerned).

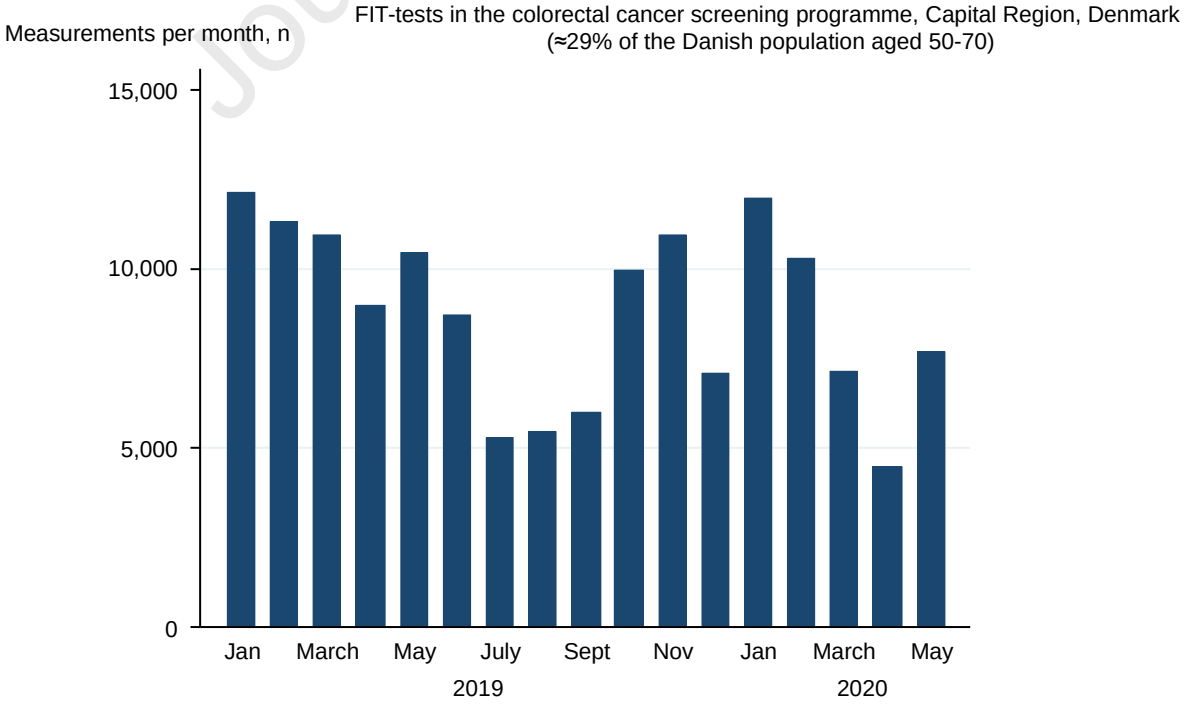
31/3/2020 *Carlo Senore -* *In Italy all screening programs have been stopped (In Piedmont since March 9th. In other regions the stopping date varied +/- one week of that date. The duration of this phase may differ across regions, but in Northern Italy it will likely be extended over Easter time and likely until early May. Colonoscopies for subjects with positive primary screening tests performed before the 'lock-down' (either positive FIT or sigmoidoscopy) have been maintained wherever possible (several health professionals have been infected and some wards /hospitals have been closed). We have reduced the number of slots available for each session, to reduce the number of people in the waiting room. Surveillance and follow-up exams have been postponed. Sigmoidoscopy screening was maintained, with less frequent slots, until March 13th, but then we stopped it, to avoid conflicting messages with the national "stay at home" campaign. We send text messages to people with pre-fixed appointments and informed them that their screening session had been cancelled.*

Denmark - 11/6/2020

Stig E Bojesen - Professor, chief physician, Dept of Clinical Biochemistry, Copenhagen University Hospital

Attached a graph of the number of FIT-tests/month in the colorectal cancer screening programme, Capital Region, Denmark (≈29% of the Danish population aged 50-70).

We did not pause the programme, however citizens chose to return fewer samples during the COVID-19 period. I do not have the corresponding numbers of colonoscopies



31/3/2020 *Morten Rasmussen - Chef For Tarmkræftscreeningen i Region Hovedstaden, Formand for Tarmkræftscreenings database -* *No changes of the colorectal cancer screening program in Denmark so far. The number of daily FIT-samples is roughly 30% lower than usual. Probably because*

the Danes are too busy watching Netflix or the news. The five Regions in Denmark that are responsible for colorectal cancer screenings sent a request to the ministry of health 10 days back. They requested a shut-down of invitations for all three cancer screening programs (bowel, breast and cervix). The ministry has not yet given their official approval. I think that if the current COVID-19 epidemic in Denmark decreases then they will recommend business as usual.

Southern Ireland - 11/6/2020

Padraic Mac Mathuna - Clin. Dir., BowelScreen, Prof. Med. Cons. Gastro. Mater Misericordiae University Hosp., Dublin, Ireland

'BowelScreen', the Irish CRC screening service, suspended the programme in March. We are now taking stock and planning to restart in a post-Covid world. The challenges are similar for all programmes given the inevitable reduction in endoscopy capacity associated with post Covid infection control measures. In Ireland, Covid has reduced national endoscopy capacity to 30% of normal which inevitably will impact on potential screening activity.

In summary

1. The National Screening Service is developing a coordinated approach to restarting all Cancer Screening programmes (Bowel, Cervical and Breast).
2. The BowelScreen programme is currently progressing colonoscopies for the outstanding FIT +ve cohort (approx 1,200 patients nationally), which we anticipate will be completed during the next 4 months. The numbers of colonoscopies required across the country will depend on the available, but significantly reduced, capacity.
3. Current national priority is the urgent symptomatic patient cohort rather than screening.
4. BowelScreen programme is working closely with the Health authorities including the National Endoscopy leads to optimise screening within the resumption of normal endoscopy services.
5. No date has been agreed yet for restarting FIT distribution which will in turn be dependent on available colonoscopy capacity.
6. Options include a reduction in the number of FIT test kits distributed or modifying the FIT threshold, again no final decision has yet been made.
7. Our current timeline is a restart in late 2020 which may be a graduated process depending on regional colonoscopy capacity.

31/3/2020 ***Hilary Coffey - Programme Manager, National BowelScreen Programme, Nat. Screening Service*** *We have suspended the 'BowelScreen programme' together with the other Breast and Cervical programmes for the duration of the current COVID crisis. FIT testing has stopped, and colonoscopy has been suspended from last week (week of 23rd March) with only emergency endoscopy services preserved nationwide. We are communicating with the clinical leads in each screening centre and directly with FIT +ve patients. In common with all European programmes the programme will recommence when the COVID crisis is over but none of us can say when that will happen. Realistically, its likely to be close to 6 months but events will determine that.*

Spain - Basque Country 2/6/2020

Isabel Portillo Villares

We are very concerned about the impact of restarting the screening programme given the challenges associated with providing colonoscopies on FIT positive cases with the proscribed safety constraints. Nevertheless we expect to progress gradually… step by step!

18/5/2020 ***Isabel Portillo Villares & Idigoras Rubio - Kolon eta Ondesteko Minbizia goiz Detektatzeko eta Jaio Aurreko Anomalia Aurkitzeko Programak***

We are going to re-start our CRC Programme step by step from this week (18/05/2020)

- Finish kit collection in the Health Centres which was suspended on 13/03/2020.
- Provide a safe area for kits to be dropped off.
- Resume screening colonoscopies for FIT +ve participants – Colonoscopy Units have elaborate a protocol to assure the safety of both patients and staff.
- Resume sending out new screening invitations: following the 2020 invitation commencing before summer. We are making provisions to stop screening again should we have a new COVID-19 outbreak.

By the end of this year, we may have to delay 100,000 invitations (50% of normal yearly invitations) because the endoscopy capacity will decrease while we are responding to the backlog of positive cases and checking patient's suitability of colonoscopy and providing additional protection measures for patients and staff.

31/3/2020 Isabel Portillo Villares & Idigoras Rubio - Kolon eta Ondesteko Minbizia goiz Detektatzeko eta Jaio Aurreko Anomalia Aurkitzeko Programak
Our programme was stopped 2 weeks ago (week of 9th March). Hospitals are not carrying out colonoscopies unless it is vital, so we stopped the invitation as well.
The population has been asked for to avoid going to the Primary health centres and because this is where they leave the completed kit, and nobody is picking them up, the screening program stopped.

All the staff in our programme has been reallocated; a call centre giving advice to the population, working with algorithms provided by the Health Department and some days Isa Bilbao and me are doing telework such as writing an article, renovating protocols, correcting our database.

Programme colonoscopies appointments are being delayed. All referrals are carefully reviewed to ensure colonoscopy is constrained to cases with high suspicion of CRC. An official notice of these arrangements was sent to Hospitals, Health Centres and the general population by mail, social networks and media.

31/3/2020 Spain - Country wide Isabel Portillo Villares & Idigoras Rubio - Kolon eta Ondesteko Minbizia goiz Detektatzeko eta Jaio Aurreko Anomalia Aurkitzeko Programak
All Regional Programmes the BC, CR, and CC have stopped until the COVID-19 crisis ends.
The number of infected by the virus is enormous and a major problem for the Public health, the society and for the industry. People is only allowed to go to the groceries, tobacco shops, post offices, walk the dog and take care of disables and only Health workers, Public drivers, and people involved on this kind of works have the permission to be outside their houses.

England - 11/6/2020

Stephen Halloran - CRC Screening Advisor

The national screening programme is systematically addressing a backlog of screening colonoscopy through its 60 Screening Centres in preparation for recommencement of screening. Patients with symptoms that put them at increased risk of obstruction are prioritised. No date for recommencing screening has been set.

15/5/2020 Stephen Halloran - CRC Screening Advisor Screening Centres are beginning to address the backlog of screening colonoscopies (FIT screening positives) and are prioritising those with the greatest clinical need. Plans for recommencing screening and extending the screening age down to 50 years of age are under consideration.

1/4/2020 Stephen Halloran - CRC Screening Advisor
The screening programme has not been formally suspended however screening invitations stopped on 23/3/2020. FIT analysis of returned kits continues, referrals to pre-colonoscopy assessment has ceased and routine screening colonoscopy is much reduced.

USA - 20/5/2020 *USA - Veterans Health Administration*

Jason A. Dominitz, National Program Director, Gastroenterology, Veterans Health Administration
The VA is encouraging the use of FIT during the COVID pandemic. Currently, all non-urgent and elective procedures are on hold, although that will be changing soon. We have prioritized procedures based upon guidance issued by the National Gastroenterology Program. This prioritization puts screening and surveillance at the lower end of the priority spectrum, however, FIT positive is at the higher, but not highest end! You might be interested in the paper (details below) from Kaiser that has just been published 19/5/2020. I think the VA is acting in a similar manner. We have a similar paper being drafted.

19/5/2020 USA - Kaiser Permanente, North California
TR Levin - Chief of Gastroenterology at Kaiser Permanente Medical Center, Walnut Creek
We will commence with mailed outreach for FIT in June. Routine surveillance colonoscopy remains on pause. Routine screening colonoscopy is also paused.

COVID-19: Long-term Planning for Procedure-based Specialties During Extended Mitigation and Suppression Strategies. Smita Rouillard, MD, Vincent X. Liu, MD MS, Douglas A. Corley, MD PhD Please cite this article as: Rouillard S, Liu VX, Corley DA, COVID-19: Long-term Planning for Procedure-based Specialties During Extended Mitigation and Suppression Strategies, Gastroenterology (2020), doi: https://doi.org/10.1053/j.gastro.2020.05.047.

An article by Rachel Issaka and provided by Jim Alison
(https://jamanetwork.com/channels/health-forum/fullarticle/2766137).
Colorectal Cancer Screening and Prevention in the COVID-19 Era - Extracts of the full article prepared by SPH
Rachel B. Issaka, MD, MAS[1,2]; Ma Somsouk, MD, MAS[3,4]
On March 18, the Centers for Medicare & Medicaid Services issued guidance that all nonurgent surgeries and medical procedures be delayed during the COVID-19 pandemic. Among the procedures being delayed are colonoscopies, the most commonly used test to screen for and prevent colorectal cancer. Since the Centers for Medicare and Medicaid Services recommendation to delay nonurgent procedures in mid-March, adult primary care and gastroenterology visits have declined by 49% and 61%, respectively, which makes achieving colorectal cancer screening goals even more challenging.

Delaying colorectal cancer screening for the 23 million adults who are past due will lead to delayed diagnoses and cancer deaths. Delays in screening will widen persistent racial, ethnic, and socioeconomic mortality disparities as rising unemployment in disadvantaged populations stifles already ``

University of California, San Francisco Health - **COVID-19 update** - **provided by Jim Alison**

Fortunately, the actions taken by all of us in the Greater Bay Area to reduce the spread of COVID-19 are having a positive impact. Under the recent San Francisco health order, all medical services, including routine and preventive care, are considered essential. This includes, but is not limited to, outpatient radiology services, mental health services, immunizations, well-woman exams, allergy shots, eye exams, physical therapy, cancer screenings and surgeries. With the exception of dental services, preventive and non-urgent care such as chronic disease management and cancer related evaluations and treatments should generally not be delayed.

We are reopening our services with safety and quality as our highest priorities. If you have been contacted to reschedule your visit, procedure or surgery, we strongly encourage you come. If you have not yet heard from us, we will be contacting you soon. Please feel free to reach out to us in the meantime, as we want you to get the care you need.

As we have progressed further into the COVID-19 pandemic, UCSF Health has successfully created a safe environment for our patients who need to come onsite for their medical care. We are confident that it is very safe to come onto our premises and to receive care with us. Here is what we have done to ensure everyone's safety:

- **Daily Health Symptom Screenings**: All of our employees, faculty, staff, patients, and visitors are screened before they are allowed to enter the building.
- **Visitor Restrictions**: We have limited the number of visitors who can accompany a patient to "essential" visitors. Although we deeply regret the anxiety that these rules create for our patients, we know that keeping all of our patients safe from COVID-19 must be our first commitment.
- **Face Masking**: We require all employees, patients and visitors to wear a mask while they are with us.
- **Physical Distancing**: We have rearranged our clinics and internal spaces so that patients, employees and faculty can maintain appropriate physical distance. Even when physical distancing is not possible, the use of masks still provides necessary protection.
- **COVID-19 Testing**: We are asking patients to be tested for COVID-19 prior to arriving on campus for hospitalization or procedures that might put others at risk for spread of the virus.
- **Separate COVID-19 Screening Clinics:** We have set up three respiratory screening clinics, one pediatric screening clinic, and one mobile drive-through testing site. By keeping those clinics separated from our regular clinics, we avoid mixing patients who may be infected with COVID-19 with patients who are receiving other kinds of medical care.
- **Hospital-grade cleaning protocols:** Our premises and all instruments are either disinfected or sterilized per a rigorous protocol. In exam rooms, this protocol includes cleaning and disinfecting all surfaces, including exam tables, chairs, keyboards, computers, chinrests, and handles.

Here is how we are measuring the safety of our environment:

- At UCSF, we have not had any transmissions from one patient to another patient.
- Of the testing we have done on patients without symptoms, 0.3% of patients have tested positive.
- Of the testing we have done on patients with symptoms, 3.33% of patients have tested positive.

We will continue to monitor our data and will make any needed adjustments in our procedures.

2/4/2020 USA - Kaiser Permanente, North California TR Levin - Chief of Gastroenterology at Kaiser Permanente Medical Center, Walnut Creek
Update 2/4/2020 *- We are in a similar boat to that described by Jason Dominitz (Veterans Health Administration).*
Currently 'FIT outreach' is 'on hold' and we are postponing non-urgent procedures.
FIT+ with follow-up colonoscopy is a 'grey area.' Some sites are providing those services and others have a three or more months of backlog. We will be similarly impacted when we resume activities again. Although we don't have a formal policy, we will be favouring non-invasive screening (FIT) over screening colonoscopy for the foreseeable future.

Douglas Corley, Director, Science & Research, Permanente Medical Group Kaiser Permanente, Northern California
https://www.gastrojournal.org/article/S0016-5085(20)30458-3/fulltext

USA - Veterans Health Administration 2/4/2020
Jason A. Dominitz, National Program Director, Gastroenterology, Veterans Health Administration
Update 2/4/2020 - *The official VA guidance to Primary Care is attached. Paragraph 7 states that we are not doing average risk screening colonoscopy now and are recommending FIT during the crisis. We are deferring all non-urgent procedures, which includes surveillance and FIT positive patients. Once we start scoping non-urgent cases, we will be bringing patients back in for endoscopy with some prioritization (e.g. FIT positive will have some priority).*

Due to the tremendous bolus of higher priority procedures to work through, there is consideration being given to continuing to favour FIT over screening colonoscopy. I wonder if Kaiser might do something similar (TR, what do you think?). It would certainly help the VA if there were other organizations who made a similar decision in light of the crisis.

Netherlands - 12/5/2020

Iris Seriese - Manager CRC screening @ RIVM

1. What you have achieved these past weeks,
    - We stopped March 16th with CRC, Breast and Cervix population screening. Yesterday (May 11) our ministry is informed that the population screening programs are starting up again in different phases. Starting with actions on CRC screening this week (hopefully half June also breast and July 1th cervix).
2. If you have a backlog, how do you plan to address it (and how you have priorities FIT testing /colonoscopy)
    - We still have around 1500 colonoscopies planned for people who received a test before March 16th. We expect that these are executed by the end of May on the ~35% of the usual capacity in healthcare providers (which is the maximum available capacity at the moment for us);
    - We started the public service today (12 May), and are following a 'first-out first-in' strategy (some have a test at home already and they can send it in again, next are the people expected to receive a test on March the 16th etc. etc.). We expect these tests will arrive into the labs soon, and we progress gradually constrained by the available capacity;
    - We didn't select 'high risk target groups' in our restart plan. Mainly because it's difficult on an ethical and political perspective and would need a lot of discussion with other interested parties. Another practical consideration was our (very robust) ICT-system would have needed changes for it to perform differently, which cost time and money which we need to use wisely just at the moment. So we have just started where we left off!
3. What plans you have for recommencing screening programmes,
    - do you have a 'catch-up plan' or
    - will a proportion of the population skip a screening episode or
    - will the invitations continue but be 2-3 months later than before the Pandemic?
      We hope our capacity increases rapidly and returns to 100% or higher - we had some overcapacity before corona! This should help us catch-up on the backlog that was created by stopping the program and with limited capacity for the past couple of months. At the moment it is uncertain how long it will take to complete the catch up.
4. Do you plan /have you considered, making any changes to your programmes?
    - Only thing we have done is to initiate extra monitoring on participation and communication to try to prevent 'no-shows' for colonoscopy.
5. Interesting observations and advice to your screening colleagues.
    - We were working on a congress in October to share the practical insights about our, and other countries' CRC screenings programs. Unfortunately due to corona we are forced to postpone this event. We will still work on more available information in English to share with you. Hopefully we can inform you about this the end of summer 2020.
6. Any numeric details and timescales that you can share with colleagues.
    - Please contact me for whatever information you think might be useful, not sure what (and if) we can help, but we would be happy to try! Iris.Seriese@rivm.nl

31/3/2020 *Patricia Hugen - Programmacoördinator Bevolkingsonderzoek Borstkanker*
Iris Seriese - Program Manager CRC Screening
In the Netherlands all cancer screening programmes were suspended on 18th March until, at least April 6. In the 'back-office' we actually manage to stop batches from March 13thand communicated to the public that we stopped on March 16th. We also stated that people who handed in the test would still be able to participate in the screening (from test to colonoscopy). This was a bit of a gamble as had a lot of people hand in their tests (probably bored perhaps?). Although we saw a reduction of around 70% last week, we still have test coming in today 1/4/2020). Actions we did or do to manage this:

- Only one of the four lab is receiving and analyzing the tests
- Sent a letter to people afterwards requesting them to wait a little before sending in their tests (maybe this proved a little too late…)
- Monitor our colonoscopy capacity very closely
- Send an extra letter to the client with the invitation to make sure they contact the clinic if the intake can proceed.

What we see today (1/4/2020) is that a little less then 40% of the clinics remain open to our screening clients, although in some regions we have some longer timelines than we are used to; no region has capacity issues that have created problems... YET! We are aware that this could change rapidly, but we know that the private clinics outside the hospitals will stay open (unless we have a complete lockdown) and even in the regions where Intensive Care are full, we see one or two hospitals taking care of the more complex clients who cannot be screened in the clinic. Luckily it seems the hospitals are working together effectively (private clinics & hospitals), and that people still don't have to travel to far if they are rescheduled somewhere else.

Besides this we are obviously thinking about when and how to restart the program. The plan will probably be based on a first in-first out principle (who waits the longest?) as we see it now, but also depends on how long the restrictions of the government and the crisis will take. Yesterday our prime minister extended the national measures till April 28th. We will definitely not restart earlier than this!

I hope we have a national agreement *on restarting. If you or other countries have great ideas about this, I hope we can learn from you.*

Belgium - 18/5/2020

Michel Candeur, Coordinateur-adjoint du CCR, Coordinateur du Centre de gestion colorectal
In **Wallonia (Belgium),** we will be gradually resuming our screening activities from May 18th.
For colorectal cancer screening, we plan to send more than 5,000 FIT kits to people's homes each week and gradually recover from the 2 months of lockdown. The invitations to participate in breast cancer screening will recommence from mid-June.
In **Brussels (Belgium)**, screening will resume gradually from May 18th.
Luc Colemont - Managing Director vzw Stop Darmkanker
The **Flemish (Belgium)** restarted week of 12th May.

Belgium (Flemish) - 31/3/2020
Michel Candeur, Coordinateur-adjoint du CCR, Coordinateur du Centre de gestion colorectal
Luc Colemont - Managing Director vzw Stop Darmkanker
Update 3/4/2010 - Wallonia and Brussels - Our laboratories will stop analysis of the FIT tests from Monday April 5, because FIT+ colonoscopies can only be performed after a delay of 4 or 5 months. We have therefore asked the 'target population' to postpone doing the FIT test until after the current COVID-19 crisis.
The **Flemish** Programme has been suspended from March 17th. Kits will not be sent out until at least April 26th.
The **Wallonia** Programme suspended the invitations for March and April and we hope to be able to start them again in mid-May if the actual health situation allows.
We continue to respond positively to spontaneous requests for kits (doctors and the public) and our laboratory continues to analyze the tests that reach us daily by post.

Addendum

Belgium **3 Regions**	**Flanders (since 2013)**	**Brussels (since 2018)**	**Wallonia (since 2009)**
Organisation coordinating the CRC screening	Centrum voor Kankeropsporing (CvKO) https://dikkedarmkanker.bevolkingsonderzoek.be/	Brussels Coördinatie Centrum voor Borstkankeropsporing www.brumammo.be/colotest	Le Centre Communautaire de Référence https://www.ccref.org/
Contact	Sarah Hoeck (program manager) Sarah.hoeck@bevolkingsonderzoek.be Sarah.hoeck@uantwerpen.be +32(0)478 71 51 91 Patrick Martens (director) Patrick.martens@bevolkingsonderzoek.be	Inge Wauters colotest@brumammo.be + 32 (0)2 736 19 84 Jean Benoit Burrion jeanbenoit.burrion@bordet.be jbburrion@brumammo.be	Michel Candeur michel.candeur@ccref.org 32 (0)10 23 82 78
Start / pilot	2008-2010 2013 fully implemented	Pilot project 11/2018-10/2021	No pilot 2009
Contact details for target population	info@bevolkingsonderzoek.be 0800 60 160 www.bevolkingsonderzoek.be	colotest@brumammo.be 02 736 19 84 www.brumammo.be/colotest	colorectal@ccref.org 010 23 82 72 www.ccref.org
CRC screening test	Since 2013: Faecal immunochemical test for Haemoglobin (FIT)	Since 09/2018 Faecal immunochemical test for Haemoglobin (FIT)	From 2009-2015: Guaiac faecal occult blood test. From 2016-onwards: Faecal immunochemical test for Haemoglobin (FIT)

Interval screening	Biannually (once every two years)	Biannually (once every two years)	Biannually (once every two years)
Cost for participant	Participating with screening by FIT is free of charge. Follow-up colonoscopy and visiting the GP are not free of charge.	Participating with screening by FIT is free of charge. Follow-up colonoscopy and visiting the GP are not free of charge.	Participating with screening by FIT is free of charge. Follow-up colonoscopy and visiting the GP are not free of charge.
Target population	Asymptomatic persons at average risk for CRC based on an age range. 2013-2016: 56-74 years 2017: 55-74 years 2018: 53-74 years 2019: 51-74 years 2020: 50-74 years	Asymptomatic persons at average risk for CRC based on an age range. 2018-today: 50-74	Asymptomatic persons at average risk for CRC based on an age range. 2009-today: 50-74
Invitation strategy	The FIT is send by mail to eligible people. Pre-paid envelop	People with a personal invitation need to collect the FIT at the pharmacy. Bilingual information (FR/NL) Pre-paid envelop	People with a personal invitation need to collect the FIT at their general practitioner or order the FIT online via the CCR website (with INSZ) or by telephone. Pre-paid envelop

Slovenia - 18th May 2020

Dominika Novak Mlakar - dr. med. spec. javnega zdravja

On 11 April 2020, the Ministry of Health allowed specialist examinations for patients without COVID-19 symptoms, whose health would have deteriorated if the planned investigation, which was cancelled due to the COVID-19 epidemic, had not been carried out. This decision made it possible to give an appoint for screening colonoscopy to participants who had a positive FIT from 14 April 2020 onwards. 900 people were waiting for a colonoscopy due to the suspension of the screening program.

The screening program call-centre schedules for colonoscopy only patients who have not had fever or signs of respiratory infection in the last 14 days and who have not been in contact with a person with such symptoms. Patients are instructed to contact the call-centre immediately if they have a fever or signs of infection so that they can reschedule the examination.

The Ministry of Health instructions require medical staff providing the specialist examination to calls all scheduled patients by phone the day before the examination to check their health status. A further health check is performed before the examination at the premises of the colonoscopy provider. People who come for a colonoscopy must wear a protective mask inside the hospital premises.

On 9th of May 2020, the Ministry of Health allowed the implementation of preventive activities. On 11th of May 2020, the screening program started sending FIT test kits to the target population. 22,000 test kits were waiting to be mailed to persons who had already provided written consent to participate in the screening (this is a requirement of the programme in Slovenia). We expect that we will be able to catch-up the current delays by the autumn if the situation remains under control.

On 31 May 2020 Slovenia will cease the countries corona epidemic requirements. However, we will continue with some protective measures like physical distancing, hygiene recommendation, ban on public gathering, limited border crossing and public transportation and such like.

31/3/2020 Dominika Novak Mlakar - dr. med. spec. javnega zdravja

On 16th March 2020 the Slovenian CRC screening programme stopped sending FIT tests to the target population. Since mid-March, most colonoscopy centres have stopped performing colonoscopies. Today, the last two centres stopped performing colonoscopies. We are not referring any new FIT positives for colonoscopy until 10th April 2020. Then we will see how to proceed. People with colonoscopy appointments were contacted and informed that the investigation had been cancelled.

Norway - 8/5/2020

Øyvind Holme - Leader, Bowel screening Dept, Dept. of Medicine, Sorlandet Hospital Kristiansand, Kristiansand, Norway

We stopped distribution of the FIT kit as of March 16th and plan to restart Aug 3rd. We will catch up with the delay during fall, which means that we will be on schedule by Dec 2020 (depending of the pandemic, of course).

31/3/2020 *Øyvind Holme - Leader, Bowel screening Dept, Dept. of Medicine, Sorlandet Hospital Kristiansand, Kristiansand, Norway*

Haven't launched our CRC screening program yet, but I guess the pandemic will postpone the start which was scheduled for the fall of 2021.

Finland 14/5/2020

Tytti Sarkeala - Cancer Society of Finland

Where are we now? During the first pilot year (04/2019 onwards), the nine voluntarily participating municipalities have invited approximately 30,000 men and women to screening (age group 60-66 years, gradually expanding to 60-74). Until March, the overall participation rate has been very good, clearly above 70 %.

During the epidemic, two municipalities have so far, suspended their invitations. From May 18th, all will continue screening +/- normally. Two reminders are sent, as before, to those who have not returned their stool sample within 4+4 weeks. The current plan is to expand the screening year e.g. couple of months (until March 2021) to ensure we complete the invitational plan (1 invitation, two reminders) for the whole target population.

March 31st - governance and invitation policies were as follows:
In Finland, the Ministry has outlined that Finnish municipalities are responsible for organizing screening services and thus may decide how to proceed.
In the CRC pilot, invitations are currently suspended until June in one municipality. Others are still sending invitations according to their regular schedule. These procedures may, however, change depending on the availability of health services and the spread of the epidemic.

New Zealand - 4/6/2020

NZ - Newspaper 'National Bowel Screening Programme restart underway'

The National Bowel Screening Programme (NBSP) restart is beginning with asking people who received a bowel screening test kit in the mail just before or during the COVID-19 Level 4 lock down to complete their kit and send it back.

NBSP Clinical Director Dr Susan Parry says about 29,000 people were sent letters reminding them to return, complete or repeat a test kit while the bowel screening programme was paused during the COVID-19 response. However, these letters also advised participants to hold off sending their bowel screening test kit back until the COVID-19 restrictions were lifted.

'The kits have a six month expiry date so we're chasing those still outstanding and asking people to complete them and send them back as soon as possible if they have not already done so.

'This is important because these tests can help detect early bowel cancers and they really do save lives. At this time of heightened awareness, this is a positive and proactive thing people can do for their health.

Dr Parry says despite the pause in invitations during the COVID-19 lockdown, the free programme continued to process test results for people already on the screening pathway. She says those with positive test results are now being offered follow-up investigations, in most cases a colonoscopy.

'DHBs are working through the backlog of cases to offer timely colonoscopies. We are asking people to be patient as they wait for their appointment but to be reassured the Ministry of Health is monitoring the situation closely.

'We understand that for some people this may be an anxious time but it is important to remember that 92 out of 100 people who return a positive test do not have bowel cancer.'

To enable DHBs to catch up on colonoscopy procedures, new invitations for screening won't be sent out until the 11th of June, with recalls and the bowel screening test kits going out a fortnight later.

The majority of the ten DHBs currently delivering bowel screening programmes are expected to start then, though the Ministry is still working with DHBs and will be able to confirm this in the near future.

Dr Parry says people who turned 75 when bowel screening was paused and are now outside the eligible screening age (60 to 74), will still be offered a screening test so they are not disadvantaged.

The NBSP, currently available in half the country's DHBs, has sent out more than 430,000 FIT kits since it began nearly three years ago and has detected more than 600 cancers, as well as removing thousands of potentially cancerous polyps.

15/5/2020 ***Susan Parry, Gastroenterologist, Clinical Lead - Gastroenterology, Nat. Bowel Screening Programme***

NZ has now moved to 'level 2' so here's hoping no second wave!
Given that hospitals here were not overwhelmed, the key issue was stopping routine endoscopy and colonoscopies while hospitals prepared for the COVID-19 onslaught but that didn't happen!
Only urgent endoscopy only was conducted during the month long 'level 4' lockdown but a priority for restarting endoscopy procedures was agreed by the MOH after consultation with the NZ Gastro Society and Surgeons. FIT +ve colonoscopy was prioritized after urgent 'symptomatics' and of the 10 live District Health Boards most were keen to get started on their existent backlog of FIT +ve colonoscopies and indeed many have started in 'level 3' if participants were willing to attend and so far the majority have done so. Most of the FIT participants awaiting colonoscopy are still less than 12 weeks from their FIT +ve date and I monitor this weekly. One Board required the endoscopy unit for possible COVID-19 ICU patients and remains 'impacted'.

From an MOH perspective and with respect to all colonoscopies over next three to 6 months, we will focus on Boards meeting maximum timeframes for urgent, routine and surveillance colonoscopy.

Endoscopy throughput is slower now due to 'COVID-19 related separation' and the need for PPE gear/ cleaning requirements but I rang and spoke to all Board's screening leads and 9/10 were keen to restart screening invitations and advised they could receive new FIT +ve colonoscopies from 1st July. Working backwards, pre-invites will start 8th June and so first posted on 11th June. First new FIT kits and re-screen kits will to be sent on 25th June. We may need to postpone the restart for one District Health Board restart by one month, but this is feasible.

We have identified 'age-outs' and can invite over a 3-month period once we restart screening.
Accurate estimates of catch up time is not possible over the next uncertain three months anticipating potential COVID-19 plus delayed resurgence & changes in symptomatic demand. We are likely to extend the first round for new District Health Board screening by 3-4 months but rescreens may be delayed similarly.

Over lockdown those already on the screening pathway continued, but 'spoilt kit' and 'reminder' letters included a sentence requesting 'not to returning a kit until after the COVID-19' crisis and, because people did not want to see their GP, we introduced and send a positive result letter to participants.

Lab capacity was unaffected. Postal slow-down increased the number of 'spoilt kits' due to 'delays in transit'.
The co-ordination centres changed its messages and reduced its staff numbers and so no 'reminder phone calls' were sent to priority groups. This will return to normal next week.

'On boarding' of new DHBs was delayed by three months and so the country roll-out has been extended by 3+ months. The new Screening IT system had just been tested before then the team and system were spirited away to develop the contact tracing solution!

A web report of 9/4/2020 - 'Screening programmes on hold during Covid-19 crisis' - Janine Rankin Apr 09 2020

https://www.stuff.co.nz/manawatu-standard/news/120812008/screening-programmes-on-hold-during-covid19-crisis

'Lockdown is no time for routine screening. There's been a free gift from the bowel cancer screening programme sitting in the corner of my room. It was a present for my 60th birthday, one of the early kits sent out since the Mid Central Health District rolled out its part of the national programme in November. The package includes step-by-step instructions on how to organise my usual toileting routine to provide a wee-free stool sample, and scoop a small amount of matter from the flushable blotter in the toilet bowl before it sinks. It seems like the sort of procedure that would be best carried out in the privacy of home, on a stress-free morning with no rush to prepare to go out to work.

Working from home, the new norm in the countdown to lockdown, and the lockdown itself offered such circumstances. Fortunately, I hesitated, not sure that my sample would count as essential business. And, indeed, a spot of investigation found that screening programmes have been suspended for the duration of the battle to contain and eliminate Covid-19.

Clinical director of the National Screening Unit Jane O'Hallahan said the decision was effective from March 24 to April 20, applying to bowel, breast and cervical cancer screening programmes. The suspension was designed to allow health providers to focus on patients with immediate health needs and reduce the risk of spreading the Covid-19 virus.
People already picked up as needing further urgent assessment would still get that help. And kits already in the post when the lockdown occurred were going to be processed.
That seemed fair enough. But it was a bit confusing to get a letter on Day 8 of the lockdown, and dated March 26, day one, reminding me I had not yet returned the completed kit. On account of the kit expiring in six months, it was important that I do it as soon as possible, it said. One imagines a computer somewhere in the bowels of the unit continuing to spit out letters in ignorance of the changed circumstances. But from now on, no new kits will be sent out. People who had kits would get a new kind of reminder letter, advising them to put their kits aside until the Covid-19 alert level was reduced to level two or below. O'Hallahan said screening programmes had not been designed to be put on hold and putting the brakes on safely had been the priority. "Once we had made the necessary changes to safely suspend new invitations being issued, we moved to developing appropriate correspondence for those already progressing along the screening pathway."

Changes to letters took time, apparently. In Mid Central, by February, 3576 people had received invitations take part in the programme. Some 1418 had returned their kit for testing, with 76 returning a positive test, with traces of blood detected in their sample. Of those, 26 had already had a follow-up colonoscopy. One cancer diagnosis had been made. Bowel screening will be offered to 29,000 people aged between 60 and 74 in the Mid-Central district over the next two years. Of course, it is not just screening for bowel cancer that has been put on hold. I won't be recalled having a mammogram in the next few weeks and women due for cervical smear tests will also have to wait a bit.

Although I guess our friendly health professionals will be wanting us to look after ourselves and look for changes that could spell trouble and call for advice if we are concerned. The helpful information I've been provided suggests, in the case of warning signs of bowel cancer, I might be concerned about blood in my bowel motion. Yes, I would. Alternatively, I might want to get checked if I notice a change in my normal bowel habits that continue for several weeks. Hopefully, by the end of several weeks the Covid-19 alert level will have been scaled back and we will be trying to enjoy a new sort of normal.'

New Zealand - 1/4/2020
Susan Parry, Gastroenterologist, Clinical Lead - Gastroenterology, Nat. Bowel Screening Programme
NZ stopped new invites on 23/3/20 and repeat invites on 24/3/20.
All non-urgent endoscopy ceased in line with BSG/JAG advice and no FIT+ colonoscopies were performed after 30/3/20.

FIT+ results are usually reported by phone to the GP team within 10 working days, if then not referral by GP to the hospital endo unit for colonoscopy, participants are contacted directly. Given that this might prove impractical due to COVID-19, on 28/3/20 we commenced sending a FIT+ result letter directly to participants - we amended the letter to provide reassurance but asked that if they had possible symptoms of bowel cancer, they should contact their GP. We also advised them that they would be contacted by the hospital once they were able to provide

colonoscopy. We stated that we hoped this would be within 3 months (it is usually a much shorter period). We asked hospitals to contact all participants who had a FIT+ result before 28/3/20 and give them the message above and if possible, to continue contacting participants with a +ve result so that they have a local contact number.
Because we cannot safely stop the pathway for those already on it, we have amended our 'reminder' and 'spoilt' kit letters to say 'please do not return your FIT kit until after COVID-19 crisis' and we have advised them of the usual lifetime of a FIT kit.

0800 number and e-mail address continue to operate with standard messages that should answer most queries. We have people who are still available to talk to invitees /participants.
We have stopped expansion of the programme into new hospital areas.
We are 'between' IT systems so this might extend the period of participant transfer.

I think it will be a minimum of 8 and possibly 12 weeks before the programme can be recommenced because if the lockdown is > 1 month, and hospitals have to recommenced colonoscopy appointments and addressed the backlog, with the National Bowel Cancer Screening FIT+ colonoscopies having a priority to rebook but behind those designated 'urgent' - it will be at least 6 weeks before things are anywhere near normal and of course it could be longer.

All national screening programmes stopped on the same day here.
We sent messages out GPs but they are receiving so many e-mails associated with recent adoption of video consultations that they probably don't read them!

AUSTRALIA - 13/5/2020

Graeme Young

Background information - Structure of the Australian Programme program
FIT are offered nationally from a central database administered by contractors to the federal government. All testing of samples and reporting to participant and nominated PCP are made from the central national registry. When positive, participants are advised to see their doctor to arrange follow-up colonoscopy. People can choose to go privately (close to 70% do so) and these are done in private facilities according to unit accreditation and endoscopist-certification rules, with obligations to provide electronic reports on findings. Waiting times are usually shortish – say weeks rather than multiple months. Those who choose public facilities (government funded) are subject to state facilities (public hospitals) and their rules for access and funding constraints. Reporting is done the same way, hospital standards are judged nationally and must be followed. Waiting lists are longer than in private and generally mean some months. The pandemic has a differential effect on these dimensions of care.

What has happened because of the pandemic?
Status of the pandemic in Australia
As of about May 8 2020, the national death count is just 97. (We not think we have a death gap like many countries and we know exactly how many died in nursing homes). By that date there have been 6914 confirmed cases. We have an aggressive testing regimen in place and anyone with any resp illness including sore throat or runny nose is encouraged to test and can easily get tested by the viral PCR test. On the world stage, we rank highly in proportion of the population testing and we have now implemented widespread tracking apps on mobile phones. Our cases have hit plateau and new cases are very uncommon with some states having no new cases for some days now. Community spread outside a couple of clusters is very low indeed. We quickly locked the country down (late February) and since then forced travellers into isolation (dedicated hotels from early March) and screened all travellers on arrival when going into isolation. Usual social-distancing rules are in place with the usual closures and limits on movements.
Medical deployments:
In late February we modelled the number of ICU beds possibly needed, made sure they were available but have used only a small fraction only of them given our success. Private as well as public hospitals had to identify beds and ICU space to meet the demand and retrain staff. This put pressure on endoscopy units which for some weeks had to be constrained.
The screening program as a result:
The federal government did not suspend centralised offering of FIT kits. It watched the effect on the health system and felt that things were such that it was reasonable to continue.
As colonoscopy services are not federally controlled, and as rules and feasibility of access vary from dimension of care and by state and location, no overall policy was implemented but in most instances FIT-positive cases received a priority over most other indications but remained subject to staff availability in facilities (which varied). As of now (mid May), hospitals are beginning a return to normal and are able, generally, to service FIT-positive cases. This is further assisted by allocating lower priority to indications for colonoscopy such as high-risk surveillance. Time will tell what the impact has been on waiting times for colonoscopy. Time will also tell if the public reduced its participation rates during the height of the pandemic, simply by their own choice. Advertisements for screening seem to have been stopped for a couple of months but we see media posts on prevention activities starting to appear again.

Australia - 1/4/2020
Graeme Young - Prof. Global GI Health, Dept. of Gastroenterology, Flinders University, Adelaide, South Australia
We are currently considering future arrangements. We currently have about 5,000 COVID-19 cases nationally (and we are a high frequency testing country) with just 18 deaths so while numbers are now jumping at about 7-10% per day we might be plateauing. Hence colonoscopy services are being managed differently across the country. As a large and sparsely populated country, national policy is not necessarily a sensible approach. Major issues are implemented in a coordinated fashion but there is capacity for some local variation.

Most colonoscopies that are not "urgent" are being rundown but "urgent" can be interpreted differently. The distribution of FIT is under consideration, my personal view is that we should not offer it if people cannot get a colonoscopy.

Northern Ireland - 7/4/2020

Health Minister Robin Swann has announced that a number of routine screening programmes have been paused to allow staff and resources to be reallocated to tackling Covid-19. Swann added: "This is a temporary suspension and I will ensure that the programmes resume at the earliest possible opportunity. In the meantime, I would urge anyone who may have symptoms of some of the conditions that we screen for to contact their GP. "All best

efforts will be made to contact patients who have received a timed appointment to let them know that the clinic will have to be postponed. I thank you for your patience and understanding at this difficult time.

Wales - 31/3/2020 **Ardiana Gjini - Consultant in Public Health Medicine - Cancer Screening Lead, Public Health Wales**
Bowel screening programme (as well as the other two cancer screening programmes) was paused as of 20th March. Meaning we are not inviting new participants and not reminding those that have not participated to do so. We had hoped to be able to continue the screening pathway for those already tested positive (colonoscopy for individuals tested FIT +) but circumstances have changed and as of this week almost all of our hospitals have stopped delivering colonoscopy lists.As of last Friday (27th) we are asking people who have received FIT kits not to return them. Uncomfortable and difficult times.

Scotland – 30/3/2020

Robert Steele – Clinical Director, Scottish Bowel Screening Programme
On the advice of the Scottish Screening Committee, Scottish Government announced the pausing of all adult screening programmes, including the FIT-base bowel screening programme, on 30/3/2020 until such time as the COVID-19 pandemic has abated sufficiently to recommence them safely. Letters have been issued to all people with a positive bowel screening test result to explain that their colonoscopy will be delayed, offering as much reassurance as is reasonable to give. Most colonoscopy across Scotland has been stopped in response to the crisis.

Taiwan - 1/4/2020

Sam Chen & Tony Hsiu-Hsi Chen - Prof. Institute of Epidemiology and Preventive Medicine, National Taiwan University
The spread of COVID19 is currently under control in Taiwan and the routine CRC screening service is still available. The screening policy might need to change if the spread of COVID19 is not well controlled.

Germany - 31/3/2020

Ulrike Haug - Head, Department of Clinical Epidemiology, Leibniz Institute for Prevention Research and Epidemiology
In Germany, I understand the health insurances are still sending out invitation letters (to those aged 50, 55, 60 and 65). These invitation letters just include general information on CRC screening and suggest a visit to a doctor (GP or gastroenterologist) to consider screening or personal counselling. Given the decentralized health system in Germany there is no national recommendation or regulation on how GPs / gastroenterologists should respond to those who request an appointment for either screening colonoscopy or a FIT. Many GPs /gastroenterologists have now decided to focus on symptomatic patients and postpone preventive services.

Poland - 31/3/2020

Jaroslaw Regula and Michal Kaminski
In Poland, we stopped sending invitations for screening colonoscopy and suspended the programme on March 16 (decision taken on March 13) – this is only for that part of the screening programme which has invitations. Those with scheduled appointment were informed and appointments cancelled all over the country. We plan to review this decision at the end of May/beginning of June.

In the opportunistic part of the programme, we are currently leaving the decision to local centres and their decision will depend on the local epidemiologic situation, availability of the personnel and the availability of protection equipment for the endoscopy services.

Guernsey - 1/4/2020

Rebecca Elliott - Guernsey Bowel Cancer Screening Programme Administrator
All screening programmes are paused.
I think we are probably a week or so behind the UK with our Covid-19 situation however as we have managed to be up to date with our invitations, no kits have been sent out since 16th March and no reminder letters to those who hadn't responded. We also wrote to those who had returned their kits after this date a letter explaining that due to the outbreak of Covid-19 we are unfortunately not presently able to analyse their kits however if they have received one from their GP (for symptoms) they should continue to complete them.

This week I am processing letters to all outstanding invitees asking them not to return their kits for the moment as they will not now be analysed whilst reassuring them that they will be the first to be re-issued with kits when we are able to resume screening.
We are also reminding them that screening is for well people and should they have symptoms they should seek advice from their GP. It is highly likely that our outstanding positives will not now receive colonoscopies during this pandemic crisis.
At this moment discussions around how/when to restart have not yet taken place (as far as I am aware).

Canada (Ontario) - 31/3/2020

Linda Rabeneck VP, Prevention and Cancer Control, Ontario Health (Cancer Care Ontario)
In Ontario all routine cancer screening is deferred, i.e. we have put the programs on "pause".
No letters of invitation, no FIT kits sent out, etc for approximately 2 weeks (from 10th March).
Analysis continues for returned kits. We are recommending that those with a FIT+ (kit distributed prior to the pause) undergoes colonoscopy and are not deferred (we call this a Priority B).
Letters of invitation, mailing of FIT kits by the lab, etc is on pause (we call this Priority C).

Hong Kong - 3/4/2020

Director, Institute of Digestive Disease - The Chinese University of Hong Kong
Update 3/4/2020 - We have (had to) stopped the screening for about two months, when hospitals are requested to handle only emergency cases saving PPE for fever wards. Since the backlog is getting very large, the policy is now to allow a step-by-step recovery of the endoscopy service. We have therefore, restarted screening, by FIT with colonoscopy in those with FIT+, using about one-third of our colonoscopy capacity. We are taking every precautious measure in our endoscopy units as we try to resume some these activities.

We have drawn up a guideline for endoscopy units which is based on guidance published by various professional societies. This can be found in JGH. Overview of guidance for endoscopy during the coronavirus disease 2019 #COVID19 pandemic https://buff.ly/2yrEoHX. That is what we are doing currently.

Title: Colorectal cancer screening in the COVID-19 era

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Abbreviations:

CRC, colorectal cancer; FIT, fecal immunochemical test; gFOBT, guaiac fecal occult blood test; PPE, Personal Protective Equipment.

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Introduction

‘All major population-based screening programs will shortly grind to an unseemly halt’.

If this had been the title of a WEO Screening Committee meeting presentation in October 2019, it would have been described as sensationalist, an exaggeration, perhaps even fiction. However, in the context of the impact that the coronavirus pandemic has had on endoscopic services over the last months, it can no longer be dismissed. But will we be prepared for the next pandemic? Will lessons have been learned?

The COVID-19 pandemic is an unprecedented global health crisis that has so far led to the deaths of more than half a million people. It has severely challenged the provision of routine health care, including screening for colorectal cancer (CRC)[1]. Many countries curtailed CRC screening, in the face of staff relocation, diminishing healthcare resources, government-imposed isolation measures, and the fear of spreading the virus during endoscopic procedures. Although an effective response to the COVID-19 pandemic is of utmost importance, failing to screen will in itself increase mortality. In regions where the spread of the virus is under control, the focus needs to extend to responsibly restoring screening. This article explores the impact that the pandemic has currently had on CRC screening, it identifies issues that need to be addressed in order to successfully resume screening, and it describes how to transform CRC screening to mitigate the adverse clinical impact of future outbreaks of COVID-19 and other infectious agents.

Effects of the COVID-19 pandemic on CRC screening and diagnosis

Impact of the pandemic on screening and diagnosis of CRC

The COVID-19 pandemic has challenged the provision of routine healthcare, resulting in a temporary curtailment of many CRC screening programs. The WEO Colorectal Cancer Screening Committee focuses on the science and practice of CRC screening and has a large membership from all parts of the world. A survey amongst selected members of this

committee showed that most national and regional screening programs paused or markedly curtailed their provision of screening during the pandemic (see supplementary file S1). This was influenced by national and regional policies, differences in healthcare systems and the structure and methodology adopted by the different screening programs. Whilst many programs were forced to pause all screening-related activities, including the provision of colonoscopy for fecal immunochemical test (FIT)-positive individuals, others maintained a colonoscopy service with markedly reduced capacity. Some centers in the US used FIT-positivity to prioritize colonoscopies for symptomatic patients. Some countries that successfully contained the spread of SARS-CoV-2, such as Taiwan and Australia, continued CRC screening. Others with stringent and effective lockdowns, such as New Zealand, were able to pause for a short period.

As screening programs around the world were forced to constrain their routine services, many people found themselves unable to participate in screening or subject to long delays for colonoscopy after a positive FIT or guaiac fecal occult blood test (gFOBT) and therefore the possibility of later stage cancer diagnosis. Previous studies have shown that delaying colonoscopy by more than 9 months following a positive FIT can led to increased risk of CRC and advanced stage CRC[2,3].

Risk of SARS-CoV-2 infection during colonoscopies

Performing a colonoscopy during the pandemic has been associated with SARS-CoV-2 infection, albeit in only a few cases. Endoscopists in Northern Italy reported a 1% rate of SARS-CoV-2 infection among endoscopy patients, and a lower rate of infection among endoscopy personnel (4.3%) than among all health care workers (10%)[4]. In the US, colonoscopy is considered a potential aerosol generating procedure and the presence of SARS-CoV-2 RNA in fecal samples has been reported in a marked proportion of infected patients[5-8].

To reduce the risk of infection, pre-procedure testing of patients or regular testing of staff for SARS-CoV-2 can be considered, after factoring in the availability of testing material, the local case rates of COVID-19, and the limited yield of testing in asymptomatic individuals. Also, personal protective equipment (PPE) (e.g. gloves, gowns, glasses, and face masks) should be worn during a screening colonoscopy or sigmoidoscopy[9]. Standard surgical face masks can be used during the endoscopy of a patient with a negative SARS-CoV-2 test or a patient without COVID-19 symptoms, not having been in close unprotected contact with an infected individual and not having recently (<14 days) traveled to an area with a relatively high infection rate. If these criteria are not met, it is advised to use additional protective measures, including a N95/FFP2 mask. 'Crowding' at medical facilities may compromise the safety of both healthcare personnel and CRC screening participants and should also be avoided. For this reason, centers in the US (Veteran's Affairs Health System) and Taiwan have accelerated plans to augment existing kit distribution with mailed FIT.

How to restart screening after a shut-down

Planning a restart

As the burden of the pandemic in many regions abates, screening jurisdictions are considering how to recommence or scale-up their screening programs. Limited resources may constrain the rate of return to full screening capacity. Compliance with jurisdictional guidance on the reintroduction of scheduled surgical and procedural work will be important, given the 'downstream' impacts of CRC screening on diagnostic (imaging, pathology, colonoscopy) and treatment services, particularly surgery. Beyond alignment, a thoughtful, phased approach is recommended.

The jurisdictions responsible for each of the steps in the screening pathway vary widely between countries and institutions[10]. Some programs manage the entire process of screening, from offering the screening test to managing the colonoscopy with a central

coordinated system, whilst others manage the initial screening test, and leave follow-up colonoscopy to their healthcare provider systems. Consequently, the return to normal activities can be complex and subject to multiple levels of control. Bottlenecks in screening can occur at one or more of the multiple steps in the screening process, which include primary care, the postal service, laboratory, pre-procedure testing appointments, colonoscopy, pathology, and cancer treatment. For the short term, it is important that the number of invitations to participate in screening aligns to the service capacity that presents the largest bottleneck. Waiting for colonoscopy or cancer treatment for several months after positive primary screening test undermines the benefit of screening and raises ethical concerns.

How to address a backlog

For organized CRC screening programs based on either FIT or gFOBT (referred to here as FIT), there will likely be a backlog of persons waiting to be screened. It may be necessary to delay resumption of screening invitations until the backlog in colonoscopy is cleared. Persons with a positive FIT or symptoms suspicious for CRC who have not yet had colonoscopy should be the first priority. The backlog of persons who are overdue for receipt of a FIT need next to be considered and prioritization can be based on their known CRC risk characteristics. Priority groups could be defined based on age and screening history (no prior screening, overdue for screening, number of recent negative FITs or potentially previous fecal hemoglobin concentration(s)). Priority could also be to given to those at lower risk of adverse effects of COVID-19 exposure. Whilst ‘no-prioritization’ is the easiest solution because it requires no program infrastructure changes, it may reduce the potential number of prevented CRC cases and deaths compared to a prioritization strategy. The size of the backlog and resources available to undertake prioritisation will influence the preferred approach.

For CRC screening programs using endoscopy (colonoscopy or flexible sigmoidoscopy) as the initial screening test, a combined approach, offering FIT to those who refuse primary endoscopy screening could be considered. If endoscopy resources are significantly constrained, FIT screening could be adopted as a short-term alternative to colonoscopy[11]. FIT screening may be more appealing for those who fear hospital visits and increased risk of SARS-CoV-2 infection, and it may extend the reach of screening to a larger proportion of the target population.

How to address limited resources

In the lock-down and post-lockdown phases of COVID-19, most endoscopy services have substantially reduced capacity[12-14]. This creates a tension between organized screening and other clinical activity, both of which will be competing for the same or similar endoscopy resources. To maximize the benefit of the reduced endoscopy capacity, prioritization as described above may offer a solution. Conversely, cohorts at low risk of advanced neoplasia, such as low-risk surveillance cohorts, or persons already examined through opportunistic colonoscopy screening, could be postponed until capacity is restored[15-18]. Surveillance using FIT for these low-risk cohorts could be a practical alternative, although the evidence base is sparse. Surveillance using colonoscopy could be limited to cohorts with higher expected benefit and diagnostic yield, for example completion of polypectomy, short term follow-up of piecemeal resection of large polyps, patients who are overdue for follow up of high-risk adenomas (large adenomas or with villous features or high-grade dysplasia)[9] and those with high risk familial syndromes e.g. Lynch syndrome. Diagnostic colonoscopy for symptoms could be postponed for those without alarm symptoms (i.e. recent onset rectal bleeding in a person over 40 years old and iron deficiency anemia in non-menstruating persons). Finally, efforts made to minimize a decrease in endoscopic capacity will mean that doctors have to work more hours and will inevitably also compete with time consuming academic, teaching and research activities.

How to maintain screening participation

An important concern when resuming screening is the potential disruptive impact that the COVID-19 pandemic might have on participation. Fear of contracting SARS-CoV-2 from healthcare settings has been widely reported and has resulted in delayed presentations of patients with a cardiovascular emergency[19]. This fear may affect screening, especially with primary endoscopic screening or post-FIT-positive colonoscopy. In addition, loss of employment-linked insurance due to a pandemic-induced economic crisis may lead to a decrease in screening participation, especially among minority groups. Many studies have demonstrated that public awareness and the way screening services are provided significantly influences screening uptake[20]. When resuming CRC screening after an outbreak of SARS-COV-2, various approaches might encourage CRC screening participation. In regions where participants collect their kits from family practitioners, pharmacists or hospitals, direct mailing of the FIT screening kit could be considered and might even increase uptake in both organized and opportunistic screening programs. Leading screening physicians, but also (well-known) patients, could consider promoting public awareness of CRC screening and its importance in local and national media during the pandemic[21]. A centralized communication team could exploit telemedicine or telephone communication instead of physical appointments to invite and encourage screening participation and colonoscopy attendance. It might also be worthwhile offering multiple screening choices to facilitate screening compliance[22]. Lastly, public confidence in safety of attending colonoscopy units could be restored by promoting regular testing of staff as well as patients[23].

Monitoring the restart of screening

To measure the impact of the pandemic and the effect of measures taken to restart CRC screening, various indicators seem relevant (Table 1). Established measures of the early impact of screening, such as the detection rate of neoplastic lesions, stage distribution of screen detected cancers and interval cancer rate, allow us to assess the impact of the delay

on these outcomes. We should consider the rate of COVID-19 infections associated with colonoscopies performed in screening programs and its impact on diagnostic follow-up for CRC. This will provide information about the actual risk associated with these procedures, as well as about the effectiveness of protective measures.

To ensure successful operation of the program during the transition to routine screening, indicators of short-term screening activity are useful. The response rate of people invited for primary screening or to colonoscopy following a positive FIT test, should be monitored so that organizational barriers and subjects' fears and concerns about the potential risk of infection can be addressed in a timely fashion. This could also include the possibility to stratify the data based on postal code or ethnicity to detect general disparities in health access between social groups. Consideration should be given to introducing a new indicator designed to measure the proportion of refusals/rescheduled appointments for colonoscopy following a positive screening test related to COVID-19 (mainly fear of being infected when attending an exam in an endoscopy center[24,25]).

In addition to existing indicators of screening activity (e.g. invitation coverage and wait time for diagnostic colonoscopy), new indicators based on the observed trends are needed to support decisions on recovery plans. Strict and continuous *real-time* monitoring of the number of procedures performed in each program/unit, as well as of the backlog, provides the necessary information to estimate the expected time to a complete recovery, to assess the ability of the program to achieve the expected targets and to make quick adjustments as problems became apparent. Ideally continuous rather than categorical data should be collected to assess the association between the 'delay' and the 'outcome'.

Modelling scenarios and outcomes

Since the COVID-19 pandemic is unprecedented, there are no clinical studies to inform decision making for our screening programs. That is where well-established and validated decision models using closely monitored outcomes from existing and new indicators come

into play. Modellers from all around the world have joined forces in the COVID-19 and Cancer Global Modelling Consortium (ccgmc.org) to simulate different scenarios of disruption and recovery strategies and predict both long-term outcomes of CRC cases and deaths as well as short-term and long-term costs and savings. Comparing benefits, harms and costs of the different scenarios, policy makers can decide upon the best recovery strategy for their programs.

Lessons to be learned

Will we be prepared for the next pandemic? Will lessons have been learned? We, as an expert working group, describe the following observations from which lessons are to be learned (Table 2).

The multiple steps in the CRC screening process make it a complex enterprise that can be easily affected if one component fails. The observations described in Table 2 could inform plans to strengthen screening programs and decrease the risk of major service disruption in future pandemic waves.

Policy makers must recognize that cancer screening is an important component of modern health care. The COVID-19 pandemic provides an opportunity for screening programs to reflect on their current arrangements and decide whether, if re-organized, they could increase coverage, uptake and clinical effectiveness, as well as being more robust to a future disruption. Considerations should include what proportion of endoscopy capacity is allocated to screening, how to maximize its yield with limited capacity, for example by moving from colonoscopy to a non-invasive screening test or adjusting the positivity cut-off for FIT-screening. Finally, we should reflect on how well we communicate with the public, ensure safety for patients and staff during endoscopic procedures, and strengthen communication and collaboration between screening, surgery and oncology. These plans can be made and implemented with the help of sound evidence from the current crisis. Extensive monitoring

and review of the current restart and upscaling efforts of CRC screening is therefore of vital importance.

Already in the pre-COVID era, healthcare systems worldwide were forced to deal with increasing demands, shortage in workforce, and budget constraints. These all strengthened the need for prevention, such as with relevant cancer screening programs. These programs reduce the need for intense treatments of patients with advanced disease. The COVID pandemic has markedly increased the aforementioned constraints and thus makes CRC screening far more instead of less relevant.

We are presented with an opportunity to strengthen CRC screening programs as we resume services blighted by the pandemic. By learning from this crisis, we can have a robust plan for the next!

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Table 1: Proposed Indicators to assess the impact of the COVID-19 pandemic on screening and outcomes for colorectal cancer

Process indicators	**Outcome indicators**
Percentage of delayed screening invitations (3-6, 6-12 months and ≥12 months)	Response rate to screening invitation
Positivity rate of FIT/gFOBT	Detection rate of CRC and advanced adenomas
Interval between positive FIT/gFOBT result and colonoscopy	Stage distribution of detected cancers
Proportion of refused/rescheduled appointments related to COVID-19	Interval cancer rate
Rate of SARS-CoV-2 infections associated with CRC screening and diagnostic follow-up	CRC-related mortality

Table 2: *Observations of the impact of the COVID-19 pandemic on colorectal cancer screening*

Healthcare resources can be rapidly overwhelmed during a pandemic.
If screening is not considered to be of high priority, it may be ignored by policy makers responding to a pandemic, especially if prior planning is lacking or delegation ineffective.
Available screening staff will quickly be diminished, be redeployed to acute services, or be indisposed due to personal or family illness or enforced isolation.
Without a plan, FIT-kit distribution, laboratory analysis and endoscopic activity can be uncoordinated and disrupted.
Without previously prepared media releases or personal communications, the public will not be adequately informed about screening arrangements.
Public anxiety can grow about missed tests, positive FIT results without a colonoscopy appointment, cancelled appointments and fear of contracting COVID-19 in an endoscopy unit.
Personal Protective Equipment (PPE) may not be available for (screening) endoscopy.
Screening IT and communication systems may not be supported due to staff shortages or modified priorities.
Without prior planning, it will not be clear how to prioritize a backlog of FIT-kits awaiting distribution or testing and many months of delayed endoscopy and associated surgery.
New or existing endoscopy units may be unsuited to social distancing and may compromise the safety of patients and staff not wearing protective gear.